

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Application No.

Art Unit:

Filed:

Examiner:

For:

PENDING CLAIMS AFTER ENTRY OF PRELIMINARY AMENDMENT

1. An apparatus for measuring decay in intensity of electromagnetic radiation passing through a radiation-absorbent sample due to absorption of radiation by the sample, comprising a source of electromagnetic radiation having a wavelength within an absorption band of the sample,

partially-reflective means for partially reflecting said electromagnetic radiation at successive positions which are spaced apart from each other along a predetermined path through the sample, said partially-reflective means being effective at each said successive position to separate incident radiation into a reflected part which is caused by the partially-reflective means to follow said predetermined path and an unreflected part,

and derivation means for deriving a value of said decay from measurements of intensity of the unreflected parts of the electromagnetic radiation produced at a number of different said positions along said predetermined path.

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2. An apparatus as claimed in claim 1 wherein said derivation means derives said value of decay from measurements of intensity of the unreflected parts of the electromagnetic radiation produced at all said positions along said predetermined path.

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3. An apparatus as claimed in claim 1 wherein said partially-reflective means comprises a plurality of discrete partially-reflective elements.

4. An apparatus as claimed in claim 1 wherein said partially-reflective means comprises at least one partially-reflective element, the or each said partially-reflective element being arranged to partially reflect said electromagnetic radiation incident at a plurality of said positions.

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5. An apparatus as claimed in claim 4 wherein said partially-reflective means comprises a pair of parallel, partially-reflective plates arranged so that said predetermined path extends alternately between the plates.

6. An apparatus as claimed in claim 1 wherein said partially reflective means is so arranged that said predetermined path occupies a substantially two-dimensional plane.

7. An apparatus as claimed in claim 1 which said partially-reflective means is so arranged that said predetermined path occupies a three-dimensional space.

8. An apparatus as claimed in claim 1 including a chamber for containing said sample.

9. An apparatus as claimed in claim 8 including means for admitting sample to and discharging sample from, the chamber.

10. An apparatus as claimed in claim 8 wherein said partially-reflective means is supported by or formed in a wall of the chamber.

11. An apparatus as claimed in claim 1 wherein said partially-reflective means has substantially the same reflection coefficient at each said successive position.

12. An apparatus as claimed in claim 1 wherein said source of electromagnetic radiation is a pulsed source.

13. An apparatus as claimed in claim 1 wherein said source of electromagnetic radiation is a monochromatic source.

14. An apparatus as claimed in claim 1 wherein said source of electromagnetic radiation is a wideband source.

15. An apparatus as claimed in claim 1 wherein said source simultaneously produces electromagnetic radiation at a number of discrete wavelengths.

16. An apparatus as claimed in claim 1 wherein said source of electromagnetic radiation produces electromagnetic radiation in the wavelength range from 2 nm to 10mm.

17. An apparatus as claimed in claim 8 wherein said source is external to said chamber.

18. An apparatus as claimed in claim 8 wherein said source is internal to said chamber.

19. An apparatus as claimed in claim 8 wherein said source forms part of the chamber wall.

20. An apparatus as claimed in claim 5 wherein said source is arranged to direct a beam of electromagnetic radiation onto a surface of one of said plates at an angle to said surface no greater than  $10^\circ$ .

21. An apparatus as claimed in claim 1 wherein said different positions are spaced apart from each other equidistantly.

22. A method for measuring decay in intensity of electromagnetic radiation passing through a radiation-absorbent sample due to absorption of radiation by the sample, comprising,

generating electromagnetic radiation having a wavelength within an absorption band of the sample,

partially-reflecting said electromagnetic radiation at successive positions which are spaced apart from each other along a predetermined path through the sample, whereby to separate radiation into a reflected part which is caused to follow said predetermined path and an unreflected part,

and deriving a value of said decay from measurements of intensity of the unreflected parts of the electromagnetic radiation produced at a number of different said positions along said predetermined path.

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